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Description

The present invention relates to a cord tightening device of synthetic resin for tightening cords or strings on various articles such as anoraks, rucksacks, shopping bags, life jackets, and other bags and pouches having openings to be closed with cords or strings. The present invention particularly relates to a cord tightening device in accordance with the preamble of claim 1.

A cord tightening device of this type is disclosed in FR-A 1 573 320. A cord to be tightened by such a cord tightening device has its end portions inserted through the body, one between the slider and one of the side walls and the other between the slider and the other side wall. When tightening the cord, the body is pulled so that the slider is moved toward the narrower opening, wedging cord portions against the side walls with the serrations of the slider.

With the prior cord tightening device, however, insertion of the cord into one or the other of the narrower and wider openings is not easy to accomplish, especially where the cord is relatively thick.

The present invention seeks to provide a cord tightening device of a simple and inexpensive construction which enables easy insertion of the cord. According to the present invention this object is realized with a cord tightening device according to the preamble of claim 1, characterized in that said face plate has a pair of cord insertion slots defined therein one on each side of said guide groove and located inwardly of said side walls, respectively, each of said cord insertion slots comprises a pair of spaced holes and a straight slit communicating between said holes.

An end of the cord may first be inserted successively through the openings of the body and the holes of the cord insertion slot with an intermediate cord portion left over the face plate, then the cord is pulled in opposite directions to force the intermediate cord portion through the insertion slot into the body.

Further developments of the invention are set forth in the depending claims.

The invention will now be described in more detail with reference to an exemplifying non-limiting embodiment thereof illustrated in the accompanying drawings, in which

Fig. 1 is a front elevational view of a cord tightening device according to an embodiment of the present invention;

Fig. 2 is a cross-sectional view taken along line II - II of Fig. 1;

Fig. 3 is a cross-sectional view taken along line III - III of Fig. 2;

Fig. 4 is a cross-sectional view of the cord tightening device, showing the manner in which it is operated with a cord extending therethrough;

Fig. 5 is a fragmentary front elevational view showing a modification of the cord tightening device of Fig. 1;

Fig. 6 is a cross-sectional view taken along line VI - VI of Figure 5;

Fig. 7 is a cross-sectional view of a mold assembly for forming a cord tightening device according to the present invention; and

Fig. 8 is a cross-sectional view taken along line VIII - VIII of Fig. 7.

Like or corresponding reference numerals denote like or corresponding parts throughout several views.

The principles of the present invention are particularly useful when embodied in a cord tightening device generally designated by the reference numeral 10 in Figures 1 through 6.

The cord tightening device 10 generally comprises a body 11 and a slider 12 slidably disposed in the body 11. The body 11 and the slider 12 are injection-molded of synthetic resin. The body 11 is of a hollow structure composed of a pair of parallel faces and back plates 13, 14 spaced from each other and integrally interconnected by a pair of side walls 15, 16 spaced from each other. The side walls 15, 16 converge toward each other upwardly (Figure 3) and terminate at a narrower opening 17 defined between the upper ends of the face and back plates 13, 14. The side walls 15, 16 diverge away from each other downwardly (Figure 3) and terminate at a wider opening 18 defined between the lower ends of the face and back plates 13, 14. More specifically, as shown in Figure 3, the side walls 15, 16 have shorter upper straight portions 19 extending substantially parallel to each other and longer lower inclined portions 20 extending downwardly from the upper portions 19, respectively, and diverging progressively away from each other in the downward direction. Preferably, but not necessarily, the side walls 15, 16 have a series of teeth or serrations 21 on inner surfaces of the lower portions 20 near the upper portions 19.

As illustrated in Figures 1 and 2, the face plate 13 has a vertically elongate guide groove 22 lying at equal distances from the side walls 15, 16 and extending from a position between the upper portions 19 of the side walls 15, 16 downwardly toward a position at the wider opening 18. The slider 12 in the body 11 is slidable along the guide groove 22.

As shown in Figures 2 and 3, the slider 12 comprises a substantially circular retainer 23 for securely pressing portions of a cord C (Figure 4) against the side walls 15, 16 and a knob 24 integral with the retainer 23 and projecting through the guide groove 22 above the outer surface of the face plate 13. The knob 24 is slidably fitted in the guide groove 22 and has a pair of outer parallel edges 25 slidably engaging inner parallel edges 26 of the face plate 13 which define the guide groove 22 therebetween. The knob 24 has on its upper surface a plurality of parallel ridges 27 for providing good frictional contact with the user's finger in moving the slider 12 along the guide groove 22. In Figure 3, the substantially circular retainer 23 has a series of step-like teeth or serrations 28 on each of diametrically opposite peripheral surfaces thereof which face the side walls 15, 16. The teeth or serrations 28 are located above and below a horizontal central line L of the retainer 23, which extends substantially

perpendicularly to the direction in which the slider 12 is slidable along the guide groove 22. The teeth 28 serve to bite into the portions of the cord C to keep the cord C securely in position with respect to the body 11 against undesired slippage. Each of the step-like teeth 23 is defined by a surface extending parallel to the central line L and another surface extending perpendicularly to the central line L. This configuration of the step-like teeth 23 allows the body 11 and the slider 12 to be injection-molded together in one mold assembly, as will be described later on.

As shown in Figure 4, the end portions of the cord C to be tightened are arranged within the body 11, one between the side wall 15 and the retainer 23 and the other between the side wall 16 and the retainer 23. When the slider 12 is slidingly displaced in the direction of the arrow A with respect to the body 11, portions of the cord C are gripped between the inner surfaces of the side walls 15, 16 and the teeth 28 which bite into the cord portions. The teeth 21 on the side walls 15, 16 are preferable since they also bite into the cord portions to retain the cord C firmly in position for greater protection against unwanted slippage of the cord C in the body 11.

As shown in Figure 1, the face plate 13 of the body 11 has a pair of laterally spaced cord insertion slots 31, 32 defined therein one on each side of the guide groove 22 and positioned slightly inwardly of the side walls 15, 16. Each of the cord insertion slots 31, 32 includes a pair of upper and lower holes 33, 34 spaced vertically from each other and located in the narrower and wider openings 17, 18, respectively, and a narrow straight slit 35 communicating between the upper and lower holes 33, 34 and extending substantially along one of the side walls 15, 16. Where a cord C to be inserted in the body 11 is relatively thick, an end of the cord C may first be inserted successively through the holes 33, 34 and the openings 17, 18 with an intermediate cord portion left over the face plate 13, as shown in Figure 1. Then, the cord C is pulled in the opposite directions indicated by the arrows D, E to force the intermediate cord portion through the slit 35 into the body 11. The relatively thick cord C can therefore be inserted in the body 11 quite easily. The cord C, once inserted in the body 11, is securely retained therein against dislodgement through the slit 35 because the slit 35 is narrow.

Each of the holes 33, 34 is substantially circular in shape. However, as shown in Figure 5, they may be of an elongate shape 36 which is elongated in the direction along the slit 35.

Figures 7 and 8 show a mold assembly for injection-molding a cord tightening device in accordance with the present invention. The mold assembly, generally designated by the reference numeral 40, comprises a first mold member 41, a second mold member 42, a first core 43, and a second core 44.

The first mold member 41 has a cavity 45 for forming the face plate 13 of the body 11, another cavity 46 for forming the knob 24, and a projection 47 for forming the guide groove 22 in the face plate 13. The second mold member 42 has a cavity 48 for forming the back plate 14 of the body 11 and a gate 49 communicating with the cavity 48 for pouring molten synthetic resin into the cavity 48.

The first core member 43 is movable into a position between the first and second mold members 41, 42 and has a substantially semicircular cavity 50 for forming one half of the retainer 23 of the slider 12. The cavity 50 is defined centrally in an end of the first core member 43 which is insertable between the first and second mold members 41, 42. The end of the first core member 43 is of a bifurcated shape composed of a pair of parallel, spaced webs 51 defining the cavity 50 therebetween. The semicircular edge which defines the cavity 50 has a series of step-like teeth or serrations 52 on each of its opposite surfaces for forming the teeth or serrations 28 on the half of the retainer 23 which is positioned below the central line L (Figure 3). The first core member 43 also has a pair of inclined recessed side surfaces 53 for shaping the lower diverging portions 20 of the side walls 15, 16 of the body 11. The inclined side surfaces 53 have respective series of teeth or serrations 54 at their ends near the cavity 50.

Likewise, the second core member 44 is movable into a position between the first and second mold members 41, 42 and has a substantially semicircular cavity 55 for forming the other half of the retainer 23 of the slider 12. The cavity 55 is defined centrally in an end of the second core member 44 which is insertable between the first and second mold members 41, 42. The end of the second core member 44 is of a bifurcated shape composed of a pair of parallel, spaced webs 56 defining the cavity 55 therebetween. The semicircular edge which defines the cavity 55 has a series of step-like teeth or serrations 57 on each of its opposite surfaces for forming the teeth or serrations 28 on the half of the retainer 23 which is positioned above the central line L (Figure 3). The second core member 44 also has a pair of parallel recessed side surfaces 58 for shaping the upper parallel portion 19 of the side walls 15, 16 of the body 11.

The webs 51, 56 of the first and second core members 43, 44 serve to separate the face and back plates13, 14 from the slider 12 after the cord tightening device has been injection-molded by the mold assembly 40. One of the webs 51 and one of the webs 56 have openings 59, 60, respectively, which will communicate with the cavity 46 of the first mold member 41 when the mold assembly 40 is completed. The openings 59, 60 provide a path for introducing molten synthetic resin into the cavities 50, 55.

For injection-molding the cord tightening device, the first and second mold members 41, 42 are brougth together, and the first and second core members 43, 44 are inserted into the combined cavities 45, 48 from upper and lower ends, respectively, thereof until the distal ends of the first and second core members 43, 44 engage each other. At this time, the semicircular cavities 50, 55 of the first and second core members 43, 44 are combined into a substantially circular cavity. Then, molten synthetic resin is poured through the gate 49 into the cavities 48, 45, 46, 50, 55. After the poured mass has been solidified, the first and second core mem-

bers 43, 44 are pulled out, and the first and second mold members 41, 42 are separated from each other, thus removing the molded cord tightening device.

As shown in Figure 8, the step-like teeth or serrations 52, 57 of the first and second core members 43, 44 have surfaces parallel and normal to the direction in which the core members 43, 44 are moved toward and away from each other. Therefore, the step-like teeth or serrations 52, 57 do not obstruct the separation of the first and second core members 43, 44 from the molded retainer 23 of the slider 12. As a consequence, the slider 12 and the body 11 can be simultaneously injection-molded by the single mold assembly 40. The cord tightening device 10 can thus be manufactured simply and inexpensively.

Further, the cord tightening device allows easy insertion of the cord C therethrough even if the cord C is relatively thick.

Claims

1. A cord tightening device comprising: a body (11) of synthetic resin having a pair of spaced face and back plates (13, 14) and a pair of converging side walls (15, 16) interconnecting said face and back plates (13, 14), and defining narrower and wider openings therebetween, said face plate (13) having a guide groove (22) defined therein; and a slider (12) movably disposed in said body (11) and slidable along said guide groove (22), said slider (12) having a retainer (23) for pressing cord portions against said side walls (15, 16), and a knob (24) integral with said retainer (23) and projecting said guide groove (22) above said face plate (13); said retainer (23) having teeth (28) on opposite peripheral surfaces thereof for biting engagement with the cord portions, said teeth (28) being located on opposite sides of a central line (L) of said retainer (23) extending substantially perpendicularly to the direction in which said slider (12) is slidable along said guide groove (22), characterized in that said face plate (13) has a pair of cord insertion slots (31, 32) defined therein one on each side of said guide groove (22) and located inwardly of said side walls (15, 16), respectively, each of said cord insertion slots (31, 32) comprises a pair of spaced holes (33, 34) and a straight slit (35) communicating between said holes (33, 34).

2. A cord tightening device according to claim 1, each of said holes (33, 34) being substantially circular in shape.

3. A cord tightening device according to claim 1, each of said holes (36) being elongate in shape.

4. A cord tightening device according to one of the claims 1 to 3, each of said teeth (28) being defined by a surface substantially parallel to said direction and another surface substantially perpendicular to said direction.

5. A cord tightening device according to one of the claims 1 to 4, said side walls (15, 16) having respective series of teeth (21) on inner surfaces thereof for biting engagement with the cord portions.

6. A cord tightening device according to claim 5, each of said side walls (15, 16) comprising a straight portion (19) and an inclined portion (20) extending from said straight portion, said teeth (21) being on said inclined portion (20) adjacent to said straight portion (19).

7. A cord tightening device according to one of the claims 1 to 6, said retainer (23) being of a substantially circular shape.

8. A cord tightening device (10) according to one of the claims 1 to 7, said body (11) and said slider (12) being in situ injection-molded of synthetic resin by a single mold assembly (40).

Patentansprüche

1. Seilklemme, umfassend: einen Körper (11) aus Kunststoff, der ein Paar im Abstand voneinander angeordnete vordere und hintere Schilde (13, 14) und ein Paar konvergierende Seitenwände (15, 16) aufweist, die den vorderen und den hinteren Schild (13, 14) miteinander verbinden und die zwischen sich eine schmälere und eine breitere Öffnung begrenzen, wobei in dem vorderen Schild (13) eine Führungsnut (22) begrenzt ist; und einen Schieber (12), der in dem Körper (11) beweglich angeordnet und längs der besagten Führungsnut (22) verschiebbar ist, wobei der Schieber (12) ein Halteteil (23) zum Anpressen von Seilbereichen gegen die besagten Seitenwände (15, 16) und ein mit dem Halteteil (23) einstückiges Griffteil (24) aufweist, das durch die Führungsnut (22) hindurch über den vorderen Schild (13) hinausragt; wobei das Halteteil (23) an gegenüberliegenden Umfangsflächen Zähne (28) zum formschlüssigen Eingriff mit den Seilbereichen aufweist, wobei diese Zähne (28) auf gegenüberliegenden Seiten einer Mittellinie (L) des Halteteils (23) angeordnet sind, die sich im wesentlichen rechtwinklig zur Verschieberichtung des Schiebers (12) längs der Führungsnut (22) erstreckt, dadurch gekennzeichnet, daß der vordere Schild (13) zwei Seileinführungsschlitze (31, 32) auf beiden Seiten der Führungsnut (22) aufweist, die innerhalb der Seitenwände (15, 16) angeordnet sind, wobei jeder dieser Seileinführungsschlitze (31, 32) ein Paar im Abstand voneinander angeordnete Öffnungen (33, 34) und einen diese Öffnungen (33, 34) verbindenden geraden Schlitz (35) umfaßt.

2. Seilklemme nach Anspruch 1, wobei jede der besagten Öffnungen (33, 34) im wesentlichen kreisförmig ist.

3. Seilklemme nach Anspruch 1, wobei jede der besagten Öffnungen (36) länglich ist.

4. Seilklemme nach einem der Ansprüche 1 bis 3, wobei jeder der besagten Zähne (28) von einer zu der besagten Richtung parallelen Fläche und von einer zu der besagten Richtung im wesentlichen rechtwinkligen anderen Fläche begrenzt ist.

5. Seilklemme nach einem der Ansprüche 1 bis 4, wobei die besagten Seitenwände (15, 16) an ihren Innenflächen eine Reihe von Zähnen (21) zum formschlüssigen Eingriff mit den Seilbereichen aufweisen.

6. Seilklemme nach Anspruch 5, wobei jede der besagten Seitenwände (15, 16) einen geraden Bereich (19) und einen von diesem geraden Bereich ausgehenden geneigten Bereich (20) umfaßt, wobei

die besagten Zähne (21) an dem geneigten Bereich (20) nahe dem geraden Bereich (19) angeordnet sind.

7. Seilklemme nach einem der Ansprüche 1 bis 6, wobei das Halteteil (23) im wesentlichen kreisförmig ist.

8. Seilklemme nach einem der Ansprüche 1 bis 7, wobei der Körper (11) und der Schieber (12) mit einer einzigen Formbaugruppe (20) durch Spritzgießen aus Kunststoff gleichzeitig hergestellt werden.

Revendications

1. Dispositif de blocage de cordon comprenant: un corps (1) en résine synthétique comportant une paire de plaques (13, 14) avant et arrière espacées l'une de l'autre, et une paire de parois latérales (15, 16) convergentes qui relient entre elles les plaques (13, 14) avant et arrière et qui délimitent entre elles une ouverture étroite et une ouverture large, ladite plaque avant (13) comportant une rainure de guidage (22) définie dans elle; et un curseur (12) disposé de manière à se déplacer dans ledit corps (11) et susceptible de glisser le long de ladite rainure (22), ledit curseur (12) comportant un élément de retenue (23) en vue de comprimer des parties de cordon contre lesdites parois latérales (15, 16) et un bouton (24) formant une seule pièce avec ledit élément de retenue (23) et faisant saillie hors de ladite rainure de guidage (22) au-dessus de ladite plaque avant (13); ledit élément de retenue (23) comportant des dents (28) situées sur ses surfaces périphériques situées à l'opposé l'une de l'autre, en vue de mordre dans les parties de cordon, lesdites dents (28) étant situées sur les côtés opposés d'une ligne centrale (L) dudit élément de retenue (23) qui s'étend sensiblement perpendiculairement à la direction dans laquelle ledit curseur (12) peut glisser le long de ladite rainure de guidage (22) caractérisé en ce que ladite plaque avant (13) comporte une paire de fentes d'insertion de cordon (31, 32) définies dans elle, une de chaque côté de ladite rainure de guidage (22), caractérisée en ce que ladite plaque avant (13) comporte une paire de fentes (31, 32) d'insertion de cordon définie dans elle, une de chaque côté de ladite rainure de guidage (22), et situées respectivement vers l'intérieur par rapport auxdites parois latérales (15, 16), en ce que chacune desdites fentes d'insertion de cordon (31, 32) comprend une paire de trous espacés (33, 34) et une fente droite (35) établissant une communication entre lesdits trous (33, 34).

2. Dispositif de blocage de cordon selon la revendication 1, chacun desdits trous (33, 34) étant de forme sensiblement circulaire.

3. Dispositif de blocage de cordon selon la revendication 1, chacun desdits trous (36) étant de forme oblongue.

4. Dispositif de blocage de cordon selon l'une des revendications 1 à 3, chacune des dents (28) étant définie par une surface sensiblement parallèle à ladite direction et par une autre surface sensiblement perpendiculaire à ladite direction.

5. Dispositif de blocage de cordon selon l'une des revendications 1 à 4, lesdites parois latérales (15, 16) comportant des séries respectives de dents (21) sur leurs surfaces intérieures, destinées à se mettre en prise en mordant dans les parties de cordon.

6. Dispositif de blocage de cordon selon la revendication 5, chacune desdites parois latérales; (15, 16) comprenant une partie droite (19) et une partie inclinée (20) s'étendant à partir de ladite partie rectiligne, lesdites dents (21) étant situées sur ladite partie inclinée (20) voisine de ladite partie droite (19).

7. Dispositif de blocage de cordon selon l'une des revendications 1 à 6, ledit dispositif de retenue (23) étant de forme sensiblement circulaire.

8. Dispositif de blocage de cordon (10) selon l'une des revendications 1 à 7, ledit corps (11) et ledit curseur (12) étant en résine synthétique moulée par injection in situ au moyen d'un seul ensemble de moulage (40).

FIG. 5

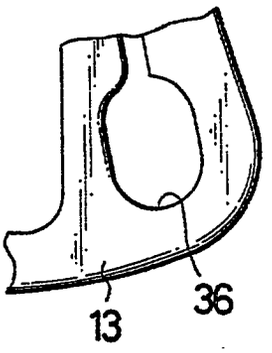


FIG. 1

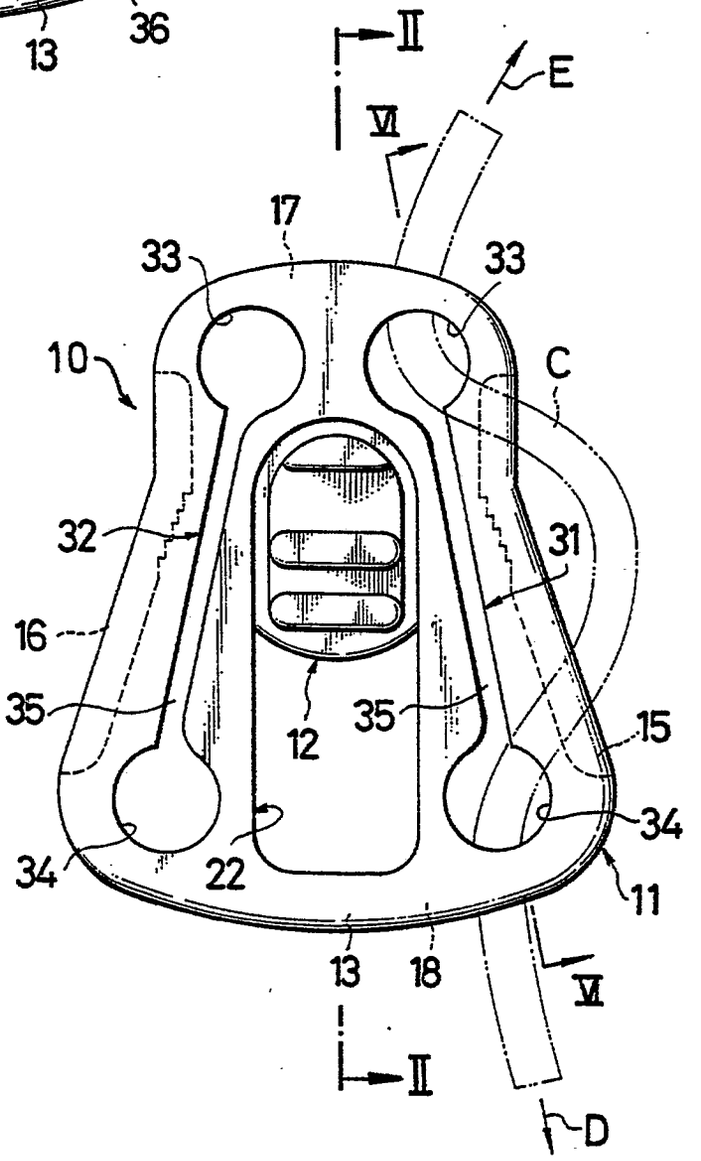


FIG. 2

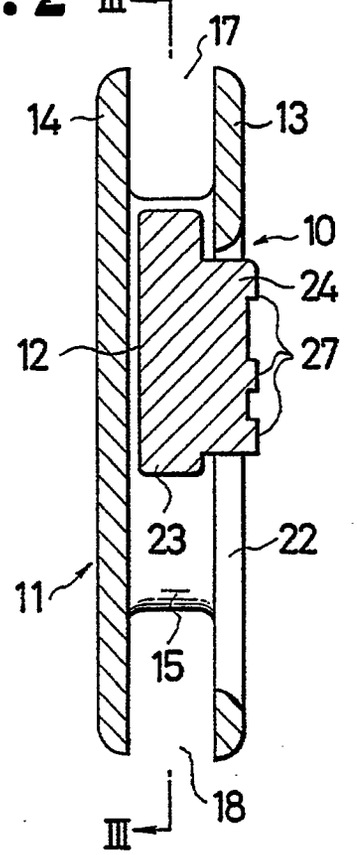

III
17
14
13
10
24
12
27
23
22
11
15
18
III

FIG. 3

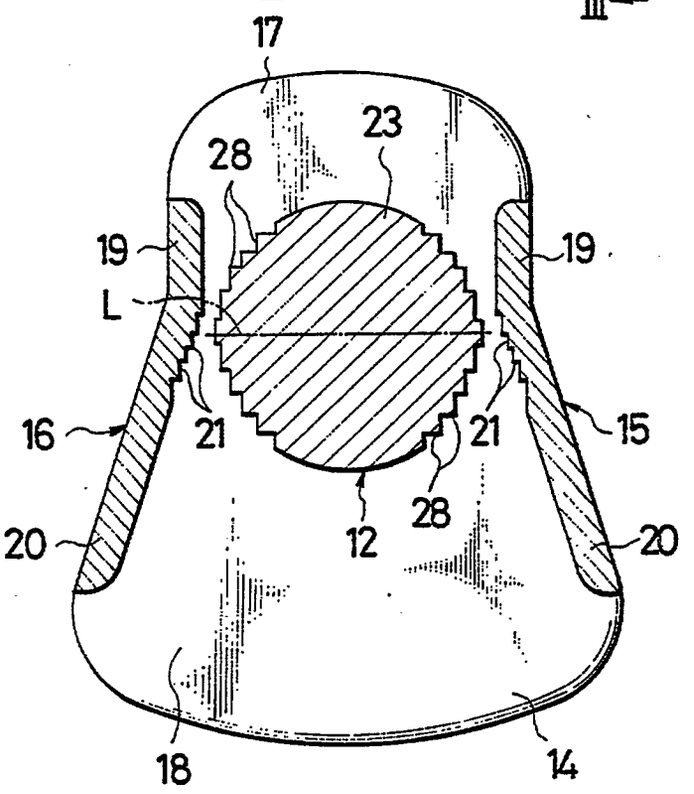

17
23
28
19
19
L
16
21
21
15
28
12
20
20
18
14

FIG. 4

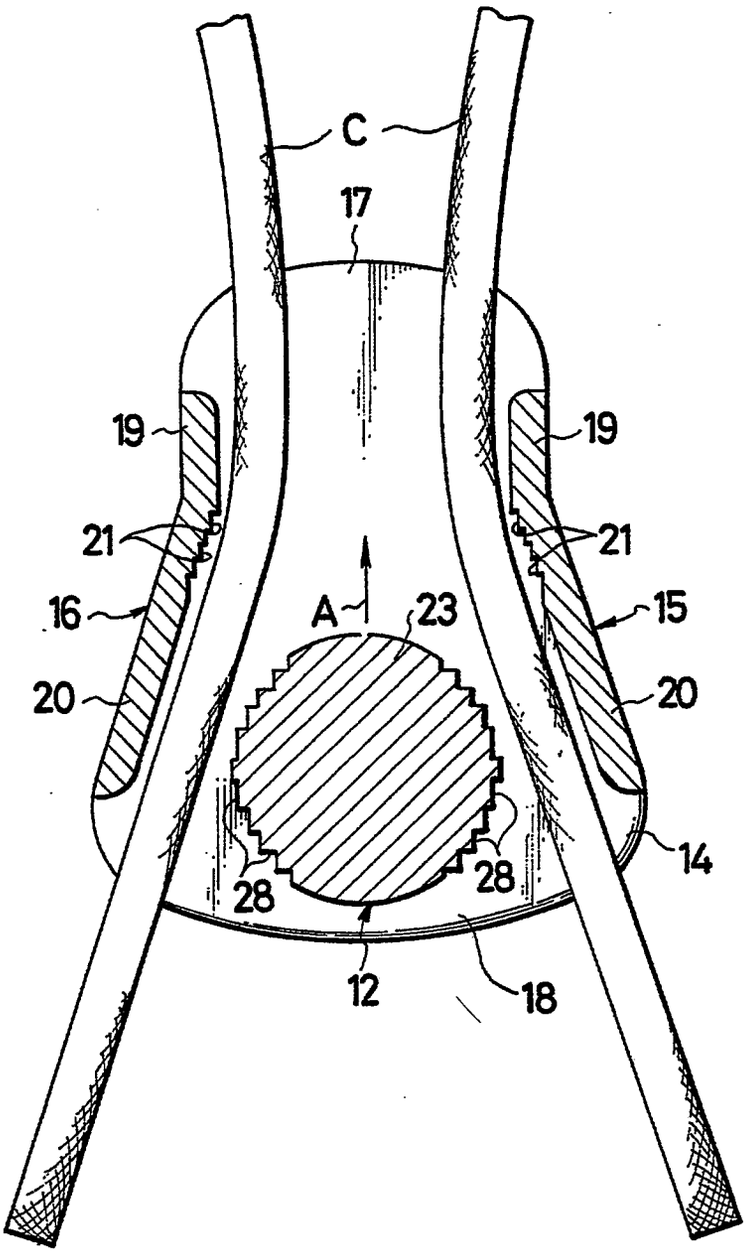


FIG. 7

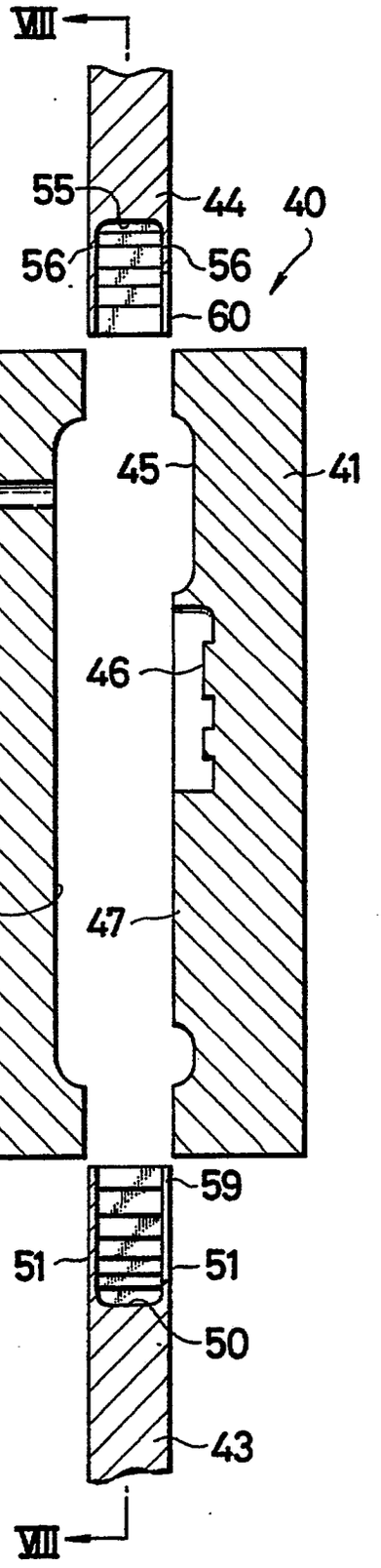

VIII
55
44
40
56
56
60
49
45
41
42
46
48
47
59
51
51
50
43
VIII

FIG. 6

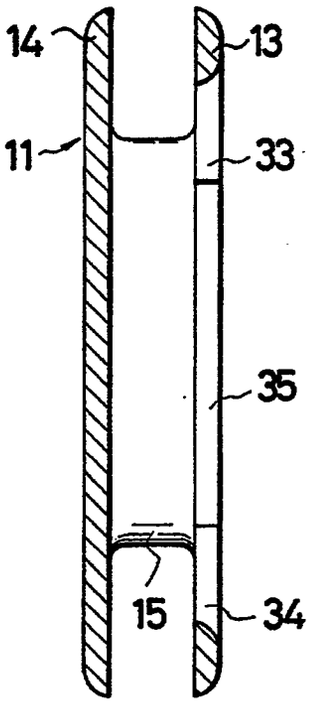

14
13
11
33
35
15
34

FIG. 8

